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REMITTANCES AND BANKING SECTOR DEVELOPMENT IN SOUTH ASIA

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Abstract

The paper investigates the interaction among foreign remittance, banking sector development and GDP in four South Asian nations that export huge pools of labour abroad. Multivariate Granger causality tests, based on error correction models, are employed with data spanning from 1976 to 2005. A key finding of the paper is that remittances and banking sector development influence per capita income in all four South Asian nations. In addition, interactions among the variables are also examined in a panel setting. As in individual country analyses, both remittance and banking sector development have positive and significant influences on the national income of South Asian countries. On the other hand, neither domestic products nor advancement in banking sector have significant impact on the remittance flows. This is new findings of the linkage between remittances and economic development, which may also be evident for countries exporting labour pools.

Key Words: Remittances; Financial Development; South Asia; Panel Causality

JEL classification: C32, F24, O16

1. Introduction

Inflow of remittance, being a prime source of foreign currency and thereby a contribution to the national economy, plays a significant role in the context of the developing nations. Since 2000, remittance inflow has been rising by an average rate of 16% per annum in the developing countries: World Bank (2006). China, India and Mexico, the top three recipients, occupied more than one third of the total remittance inflow, as of 2006. Only

three of the South Asian countries, namely: Bangladesh, India and Pakistan, made a foothold in the list of top 25 recipients. According to the same source 50% of the remittance flow recorded globally passes through the informal funds channel. This particular fact captures the basic idea of this paper that remittance inflow through formal channel may have a potential to contribute more to the South Asian economies via developmental impacts of the banking sector (Hinojosa-Ojeda, 2003; Terry and Wilson, 2005, and World Bank, 2006).

Remittances enhance the development of banking sector in a number three ways. Firstly, remittances supply the households with excess cash that might potentially generate a transaction demand for financial services. Secondly, the fees earned through remittance processing, can add to the profitability of a branch. Banks with the state of the art infrastructure can explore this new market opportunity. Thirdly, banks can target the 'bottom of the pyramid' segment of the remittance receiving market, where, a substantial portion of the remittances is likely to remain unbanked.

The development of the banking sector promotes an open market competition among the money transfer firms resulting in the reduction of transaction costs and thereby pulling more remittances from the informal to formal channel. Remittances may potentially contribute to the long-term growth through higher rates of capital accumulation. In absence of an efficient financial system, as commonly seen in the developing economies, the untapped market with poor credit rating can potentially be approached by the inflow of remittances. Therefore, remittances may contribute to alleviate credit constraints to the 'bottom of the pyramid' of the market, by improving the allocation of capital, and therefore accelerating economic growth.

In addition to promoting banking sector development, foreign remittance has an immense direct impact on economic development of receiving nations as well (Adelman and Taylor, 1990). Remittances inflow can directly work for community development (Cordova, 2004; De Haas, 2007) which can eventually result in economic development. In addition, remittance inflow, as a source of external capital, can contribute to bridging the gap between domestic savings and investment and thereby promoting economic growth in the long run. In addition, remittances are also a valuable source of foreign

currency that could be used for meeting external debt obligation denominated in international currencies keeping the wheel of development active for the receiving nation.

This paper presents both country and panel analysis of remittances and finds that remittance and banking sector development have positive and significant influence on the national income of South Asian nations. On the other hand, the impact of neither domestic products nor advancement in banking sector on the remittance flow could not be established. Remittance seems to flow independent of the macroeconomic aspect of the recipient nation. The findings of this paper clearly suggest that remittance plays a very important role in South Asia. In the light of this findings, The government may initiate new programs to maximize the benefits of remittances which could improve the welfare of migrant workers and their families, especially poor rural households by providing institutional support for the promotion of formal and semi formal remittance services and other support services taking advantages at the South Asian well established microfinance network. More specifically, governments could encourage remittance inflow through formal and semi-formal channel by providing low cost but reliable services. In addition, government agencies are responsible for creating awareness among the migrant workers and their families about the appropriate uses of the hard-earned remittances. They should also promote better investment opportunities for sustainable and productive use of remittances through support mechanism for development of microenterprises.

This paper aims to investigate the causal relationship between foreign remittances, banking sector development and GDP for South Asia. Unlike some other papers, which include financial development indicators, this paper uses an indicator for development in the banking sector only. The reason for this narrower focus is the direct role of commercial banks in channeling foreign remittances to the recipients of the home country. It is therefore expected that volume of remittances have an immediate influence on banks' ability for credit expansion.

The structure of the paper is as follows. Section 2 describes the literature review. Section 3 includes the South Asian remittances flow Section 4 presents the data and

methodology. Section 5 analyzes empirical analysis and results and finally, Section 6 presents the concluding remarks.

2. Literature Review

Remittances are the major sources of foreign exchange earning and important implications for the remittance-recipient countries because of their increasing volume. These private flows are mostly spent on consumption, housing, and land, and are not used for productive investment discussed in the literature. Remittances affect the economy from both the micro and macro perspective. They will influence poverty, inequality, growth, education, infant mortality, welfare, entrepreneurship, local livelihood and etc.

The significance of remittances in stimulating the economic growth, specifically at the interaction between remittances and the banking sector development, an aspect ignored in the literature. A well and sound banking system performs a number of key economic functions and their development has been shown to the development of financial system, which will lead to foster economic growth. In this paper, we explore how banking sector development influences a country's capacity to take advantage of remittances. The relationship between remittances and the banking sector is important because some argue that intermediating remittances through the banking sector can magnify the developmental impact of remittance flows (Hinojosa-Ojeda, 2003; Terry and Wilson, 2005, and World Bank, 2006). The positive effect of financial development on growth has been extensively documented (Beck, Demirguc-Kunt, & Levine, 2004; Levine, 1997, Studies that relationship between remittances and investment, where remittances either substitute for, or improve financial access, conclude that remittances stimulate growth (Giuliano & Ruiz-Arranz, 2005; Toxopeus & Lensink, 2006).

Using cross-country data, Aggarwal, Demirgüç-Kunt, and Martinez Peria (2006) find evidence that remittances are associated with banking sector development across a broad set of countries such as Guatemala, El Salvador, Ecuador and Honduras and Mexico,. The differences are large in Guatemala, El Salvador, Ecuador and Honduras, but much smaller in Mexico, where 19% of remittance-receiving households have accounts

compared with 16% of non-recipient households. Neither study makes any claim about the causality of the associations they report. Giuliano and Ruiz-Arranz (2006) also finds a positive correlation between the level of remittance flows and measures of bank deposits, but much weaker correlations between remittances flows and bank credit. Orozco and Fedewa (2007) investigates that households receiving remittances in five Latin American countries are more likely than non-recipient households to have bank accounts. Freund and Spatafora (2005) examine that concentration in the banking sector, financial risk, and exchange rate variability typically increases transaction costs. Financial sector reforms that address the structural problems in the receiving, and sending countries are also likely to lower the cost of remittances. Cross-border uniformity in regulations related to remittances, and regulatory interventions, where fees are prohibitive have been proposed as other cost-reducing measures (Ratha & Riedberg, 2005; Sander & Maimbo, 2005).

The link between remittances, banking sector development, and growth is an important issue for remittances dependence countries. Development of the banking sector reducing the transaction costs that might stimulate the investor to invest in different investment projects with high rate return and therefore increase the economic growth in the country. Remittances might become a substitute for inefficient credit markets by helping local entrepreneurs by pass lack of collateral or high lending costs and start productive activities. Remittances affect banking sector for several reasons such as temporary excess cash for banking services, processing fees for transactions and etc. The potential to collect these fees might induce banks to expand their outreach, locate close to remittance recipients, and increase their demands for banking services, since banks offer households a safe place to store this temporary excess cash. Entrepreneurs in developing countries confront much less efficient credit markets and available evidence indicates that access to credit is among their biggest concerns (Paulson and Towsend, 2000). Dustmann and Kirchamp (2001) find that the savings of returning migrants may be an important source of startup capital for microenterprises based on the micro level data.

3. Data and Methodology

3.1 Data

For the purpose of this paper, real GDP per capita (base year = 2000), remittances flow as percentage of GDP and total bank credit disbursement as percentage of GDP are used. The data span from 1976 to 2005 and are extracted from World Development Indicator (WDI) database of the World Bank 2006 CD–ROM. The variable that proxies for the banking sector sector development has also been widely used in the literature. For example, Giuliano and Ruiz–Arranz (2009) uses this measure of financial development to estimate the extent of intermediation provided by the banking sector in an economy. On the other hand, Jalil et al. (2010) consider supply of credit to private sector is a better indicator of development in the banking sector than other indicators, for example, amount of liquid liabilities to GDP or M2 to GDP. Baltagi et al. (2009) also use private sector credit disbursement as the crucial variable in their study investigating the relationship between financial development and openness.

3.2 Methodology

The multivariate Granger[1] methodology will be applied to identify direction of causality among the variables of interest, i.e. remittance, financial development and GDP. Consider the following vector autoregression (VAR) representation,

$$\begin{bmatrix} GDP_t \\ REM_t \\ BSD_t \end{bmatrix} = \begin{bmatrix} \beta \\ \varphi \\ \delta \end{bmatrix} + \begin{bmatrix} \Phi_{11}(L) & \Phi_{12}(L) & \Phi_{13}(L) \\ \Phi_{21}(L) & \Phi_{22}(L) & \Phi_{23}(L) \\ \Phi_{31}(L) & \Phi_{32}(L) & \Phi_{33}(L) \end{bmatrix} \begin{bmatrix} GDP_t \\ REM_t \\ BSD_t \end{bmatrix} + \begin{bmatrix} \varepsilon_t \\ u_t \\ v_t \end{bmatrix} \tag{1}$$

where, *GDP*, *REM* and *BSD* denote three potentially endogenous variables: real GDP per capita, remittance as percentage of GDP, and *BSD*, (i.e. total bank credit disbursement as percentage of GDP), an indicator for banking sector development, respectively and L is the lag operator. β, φ and δ are intercepts and ε, u and v white noise error. The null of no joint significance can be tested using F–tests.

[1] The method was proposed by Granger (1969) and popularized by Sims (1972).

Empirical works based on time series data assume that the underlying time series is stationary. However, many studies have shown that majority of time series variables are nonstationary or integrated of order 1 (Engle and Granger, 1987). The time series properties of the data at hand are therefore studied in the outset. In addition to applying traditional augmented Dickey–Fuller (ADF) tests, Phillips and Perron (PP) tests are also applied as the latter tests are more efficient in the presence of a one–time structural break in the data.

The above specification of the causality test assumes that the time series at hand are mean reverting process. However, it is highly likely that variables of this study are nonstationary. Formal tests will be carried out to find the time series properties of the variables. If the variables are *I* (1), Engle and Granger (1987) assert that causality must exist in, at least, one direction. The Granger causality test is then augmented with an error correction term (ECT) as shown below:

$$\Delta GDP_t = \beta_0 + \sum_{i=1}^{m} \beta_{1i} \Delta GDP_{t-i} + \sum_{i=1}^{m} \beta_{2i} \Delta REM_{t-i} + \sum_{i=1}^{m} \beta_{3i} \Delta BSD_{t-i} + \beta_4 Z_{t-1} + \varepsilon_t \quad (2)$$

$$\Delta REM_t = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta REM_{t-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta BSD_{t-i} + \sum_{i=1}^{n} \varphi_{3i} \Delta GDP_{t-i} + \varphi_4 Z_{t-1} + u_t \quad (3)$$

$$\Delta BSD_t = \delta_0 + \sum_{i=1}^{q} \delta_{1i} \Delta BSD_{t-i} + \sum_{i=1}^{q} \delta_{2i} \Delta GDP_{t-i} + \sum_{i=1}^{q} \delta_{3i} \Delta REM_{t-i} + \delta_4 Z_{t-1} + v_t \quad (4)$$

where Z_{t-1} is the ECT obtained from the long run cointegrating relationship between GDP, Remittance and Financial Development. The above error correction model (ECM) implies that for each of the model possible sources of causality are two: lagged dynamic regressors and lagged error correction term. If estimated coefficients of either sources of causation turn out to be significant, the null of no causality is rejected. For instance, by equation (2), given the presence of financial development indicators, remittances Granger cause GDP, if the null of either $\sum_{i=1}^{m} \beta_{2i} = 0$ or $\beta_4 = 0$ is rejected. On the other hand, if we can not reject either of the null hypothesis, it is concluded that no causation exist from independent variables to dependent variable.

3.3 Panel Granger Causality

For the time series analysis of Granger causality, the data span needs to be sufficiently long to capture the direction of causality. A motivation of considering the panel Granger causality tests is to have more reliable results from a panel than from the individual countries as the former contain more information than the latter (Baltagi, 2005). The most common framework for panel causality tests is proposed by Holtz–Eakin et al. (1988, 1989).

Examination of causality in a panel framework begins with pooling the data across time and groups and allowing for individual effects. Consider the following equations (5) through (7), where, variables are as defined before, subscript *i* indexes cross section units and *t* denotes time dimension and the individual effects are represented by the term f. Estimation of the equations using pooled OLS would, however, be biased as lagged dependant variables are correlated with error terms including individual effects.

$$GDP_{it} = \beta_0 + \sum_{i=1}^{m} \beta_{1i} GDP_{it-i} + \sum_{i=1}^{m} \beta_{2i} REM_{it-i} + \sum_{i=1}^{m} \beta_{3i} BSD_{it-i} + f_{GDPi} + \varepsilon_{it} \tag{5}$$

$$REM_{it} = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} REM_{it-i} + \sum_{i=1}^{n} \varphi_{2i} BSD_{it-i} + \sum_{i=1}^{n} \varphi_{3i} GDP_{it-i} + f_{REMi} + u_{it} \tag{6}$$

$$BSD_{it} = \delta_0 + \sum_{i=1}^{q} \delta_{1i} BSD_{it-i} + \sum_{i=1}^{q} \delta_{2i} GDP_{it-i} + \sum_{i=1}^{q} \delta_{3i} REM_{it-i} + f_{BSDi} + v_{it} \tag{7}$$

In order to remove correlations between the lagged terms and individual effects with the errors, the variables are differenced as follows

$$\Delta GDP_{it} = \sum_{i=1}^{m} \beta_{1i} \Delta GDP_{it-i} + \sum_{i=1}^{m} \beta_{2i} \Delta REM_{it-i} + \sum_{i=1}^{m} \beta_{3i} \Delta BSD_{it-i} + \Delta\varepsilon_{it} \tag{8}$$

$$\Delta REM_{it} = \sum_{i=1}^{n} \varphi_{1i} \Delta REM_{it-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta BSD_{it-i} + \sum_{i=1}^{n} \varphi_{3i} \Delta GDP_{it-i} + \Delta u_{it} \tag{9}$$

$$\Delta BSD_{it} = \sum_{i=1}^{q} \delta_{1i} \Delta BSD_{it-i} + \sum_{i=1}^{q} \delta_{2i} \Delta GDP_{it-i} + \sum_{i=1}^{q} \delta_{3i} \Delta REM_{it-i} + \Delta v_{it} \tag{10}$$

It is important to note that, while differencing has removed the individual effects, a problem of simultaneity has now been introduced as the lagged endogenous variables are

correlated with the new differenced error terms. So we check if the differenced errors are MA(1) by way of testing for the absence of second order serial correlation. In addition, we solve this problem by following the methodology adopted in Al-Iriani (2006). In particular, we have used instrumental variable approach with lagged values of dependent variables being used as instruments. However, empirical literature suggests that presence of too many moment conditions increase biasness as well as efficiency (Baltagi, et al., 2009). Therefore, the over–identification restrictions are tested using the Sargan test.

Each panel equation from (8) through (10) is then estimated using the generalized methods of moments (GMM) procedure as proposed by Arellano and Bond (1991). The direction of causality is identified within this multivariate framework by testing for joint hypotheses on the significance of a set of estimated coefficients in the presence of the other variables. For example, in the context of equation (8), we test $\sum_{i=1}^{m} \beta_{2i} = 0$ to identify the influence of remittance on GDP while holding banking sector development as constant. Similarly, testing for the joint significance $\sum_{i=1}^{m} \beta_{3i} = 0$ identifies the direction of influence running from banking sector development to GDP. The Wald test statistics follow a chi-square distribution with degrees of freedom equaling ($k - m$) where k is the number of variables.

3.4 The Hypotheses

Based on the review of existing literature, we develop the following hypotheses for testing in this paper. More specifically, the hypotheses would postulate expected relationship among variables under investigation.

Hypothesis One: *In the long run, both remittance and banking sector development will have positive impact on GDP*.

We expect that past values of both banking sector development and remittance would positively impact GDP of a country. This means that the ECM term would be significant showing the long run impact and cumulative sign on these variables would be positive.

Hypothesis Two: *Increase in GDP will have negative impact on remittance flow but positive impact on banking sector development.*

As a nation's GDP level rises, the number of expatriates is expected to fall. Workers will find better options at home than to travel abroad. This is especially true the south Asian countries as most of the expatriates going abroad fall in the laborer category. On the other hand, the rise in GDP would normally be associated with financial sector development in general and banking sector development in particular.

Hypothesis Three: *Given the level of GDP, remittance flow and banking sector development will positively influence each other.*

South Asian nations are among the top recipients of foreign remittance. Commercial banks in these nations work hard to attract expatriates' money through their foreign branches. In addition, in order to facilitate disbursement of the remittances to their local beneficiaries, banks have extended a number of services. Therefore, it is naturally expected that remittance flow and banking sector development will boost each other.

4. Empirical Results

The estimation begins with an examination of time series behavior of variables at hand. In particular, unit root tests are reported in Table 1 where both ADF tests and KPSS tests results confirm that the variables under consideration are all nonstationary. Optimal lag length for ADF is selected using general–to–specific down method from a maximum lag equal to 8. The lag truncation parameter for the KPSS test is selected using the formula $4\left(T/100\right)^{1/4}$.

Once it is established that variables are $I(1)$, the next step is to test for existence of any cointegrating relationship between GDP per capita, and remittance and bank credit disbursement.

Table 1: Unit Root Test Results

	ADF			*KPSS*		
Country	*GDP*	*REM*	*BSD*	*GDP*	*REM*	*BSD*
Bangladesh	4.126(4)	–0.082(0)	0.450 (3)	1.062*	0.916*	1.068*
India	1.950 (0)	–0.097 (8)	–0.125 (1)	0.886*	1.090*	0.475*
Pakistan	–0.134 (6)	–2.478 (7)	–2.342 (0)	1.046*	0.672*	0.489*
Sri Lanka	–2.304 (7)	1.981 (8)	–1.668 (0)	1.096*	0.887*	0.549*

Note: * denotes significance at 5% level.

The Johansen (1991) LR test of cointegration is applied and results are shown in Table 2. The appropriate VAR lag length is selected using AIC. Table 2 shows that the variables for all countries are cointegrated. Therefore, the Granger causality tests will be modeled using ECM as explained in Equations (2) to (4).

Table 2: Cointegration LR Test Results

$X' \equiv [GDP, REM, BSD]$; [Max VAR lag k = 4]				
	Bangladesh (4)	India (3)	Pakistan (3)	Sri Lanka (2)
Null	λ–*trace* [*p–value*]	λ–*trace* [*p–value*]	λ–*trace* [*p–value*]	λ–*trace* [*p–value*]
$r = 0$	81.620	61.023	66.355	55.789
	[0.000]	[0.0002]	[0.0000]	[0.0012]
$r \leq 1$	36.165	26.678	36.133	23.245
	[0.0013]	[0.0374]	[0.0013]	[0.1021]
$r \leq 2$	7.4633	8.7052	9.2167	5.1351
	[0.3077]	[0.2048]	[0.1714]	[0.5848]

Notes: The r denotes the number of cointegrating vectors. VAR lag was selected using Akaike Information criterion (AIC) from a maximum lag of 4. Presence of both a constant and a restricted trend was assumed in cointegrating regression for all countries.

Table 3 reports multivariate granger causality tests results. The literature on granger causality documents the fact that the results of such tests are sensitive to the selection of VAR lag length. The optimal lag length for the VAR in this paper has been selected by minimizing the AIC as Liew (2004) proves supremacy of AIC and FPE over other selection criteria in small sample. The observations on the results presented in Table 3

will be made for each country separately. This will help us capture the direction of causality for each case.

For Bangladesh, unidirectional causality runs from the development of banking sector (long run) and from remittance inflow (short run) to per capita income. This provides some support for the hypothesis one. However, No feedback causality is detected. Moreover, it is found that past values of remittances positively affect national income while influences of banking development come from the lagged error correction term only. The development of banking sector is not found to be influenced by either remittances inflow or growth in national income, even in the long run. Hypothesis two and three are not supported with empirical findings for Bangladesh. A possible reason why banking sector is not significantly influenced by remittance is the overwhelming practice of sending wage earners' money through unofficial and illegal channels.

Turning to results for India, we find that there exists of bidirectional causality between GDP growth and remittances in the long run. In the short run, an increase in GDP causes a fall in remittance inflow as seen from the negative sum of coefficients of lagged values of GDP as predicted in hypothesis two. This is not quite unexpected as a rise in recipients' income may decrease the local need for foreign remittances. In addition, there is only unidirectional long run causality flowing from the banking sector development to remittances volume and GDP per capita. In other words, development in the banking sector affects remittances and GDP, but is not influenced by them providing only partial evidence in favor of the hypothesis three.

The results for Pakistan reveal that all three variables at hand Granger cause each other either in the short run or in the long run. Remittances and GDP per capita are influenced by each other, as for the case of India, through bidirectional causality. Bidirectional causality is also found between banking sector development and national income supporting hypothesis one. Similarly, remittances and banking sector development are also linked to each other through bidirectional causality. Thus evidence for the hypothesis three is not available. A surprising feature for Pakistan is that all short run causalities produce negative impact when considered in cumulative.

Table 3: Multivariate Granger Causality Results

Bangladesh	*GDP*	*REM*	*BSD*	ECT_{t-1}
GDP (4)	----	3.166*$^{(+)}$ (0.047)	1.479 (0.309)	–2.630* (0.025)
REM (4)	2.450 (0.119)	----	0.334 (0.835)	–0.374 (0.713)
BSD (4)	0.265 (0.911)	0.267 (0.890)	----	–1.584 (0.141)
India	*GDP*	*REM*	*BSD*	ECT_{t-1}
GDP (1)	----	0.011 (0.918)	0.107 (0.744)	–2.887* (0.013)
REM (1)	3.037*$^{(-)}$ (0.083)	----	2.124 (0.153)	– 2.244* (0.028)
BSD (4)	0.317 (0.852)	0.444 (0.777)	----	–0.3429 (0.760)
Pakistan	*GDP*	*REM*	*BSD*	ECT_{t-1}
GDP (4)	----	2.835*$^{(-)}$ (0.066)	2.053 (0.179)	–2.762* (0.020)
REM (4)	4.429*$^{(-)}$ (0.023)	----	3.519*$^{(-)}$ (0.039)	–0.726 (0.501)
BSD (4)	0.434 (0.790)	2.157 (0.172)	----	–2.255* (0.046)
Sri Lanka	*GDP*	*REM*	*BSD*	ECT_{t-1}
GDP (4)	----	2.621 (0.110)	1.970 (0.165)	–0.834* (0.096)
REM (4)	0.697 (0.68)	----	1.476 (0.340)	–0.861 (0.571)
BSD (4)	1.576 (0.268)	1.440 (0.331)	----	–2.074* (0.063)

Notes: Bootstrapped p–values are obtained based on 1000 replications, with simulated normal errors[2] and presented within parentheses below the test statistic. The optimal lag length is selected by minimizing the AIC from a maximum lag of 4[3]. (*) rejects the null at 0.10 level of significance. (+/–) next to the asterisk shows the cumulative sign of coefficients.

As for Sri Lanka, it is evident that remittances flow Granger cause national income per capita in the long run through unidirectional causality. However, there is existence of

[2] Resampling the residuals produces qualitatively similar results.

[3] We also rerun the whole estimation selecting the optimum lag length by maximizing of value of R^2 as suggested by Abdalla and Murinde (1997). The chosen lag lengths are very much similar and causality test results are qualitatively same.

bidirectional causality between banking sector development and GDP per capita. Between remittances and banking sector development, a unidirectional causality is running from the remittances flow to banking sector development. All the existence of causalities for Sri Lanka is, however, long run by nature happening through the error correction terms.

Overall, a key finding of the results is that remittances and banking sector development (one in the presence of the other) influence per capita income in all four South Asian nations. The importance of wage earners' remittances on these economies, possibly also through enhancing banking sector capability, is quite evident. This finding is not surprising given the fact that the four countries being considered in this paper are part of the top 20 remittances receiving country of the world (Seddon, 2004). Remittances as proportion of total GDP in these South Asian nations are also quite significant. For example, for Sri Lanka, official flow of remittances account for 7% of GDP (Stalker 2001, p. 110). This result is indicative support in favor of hypothesis one. A second finding related to the hypothesis two is that remittances flow Granger cause banking sector development only for Pakistan and Sri Lanka, but not for Bangladesh and India. And a third finding is that development of banking sector Granger cause remittances inflow in India and Pakistan, but not Bangladesh and Sri Lanka.

Having discussed the multivariate causality results obtained on individual nations in South Asia, we now move to look at the results of the panel causality using method as described in an earlier section. Examination of the causality in a panel setting would give us better approximation of the relationship among the variables at hand by exploiting more information embedded in the whole panel. In addition, it would also provide with an opportunity to check robustness of the results obtained from time series analysis as documented above.

Table 4 presents results of the panel causality tests. It is obvious from Table 4 that both remittance and banking sector development have positive and significant influence on the national income of South Asian nations.

Table 4: Panel Causality Test Results

Panel A: Wald Test Statistics			
Dep. Var.	GDP	REM	BSD
GDP	-----	51.284 (+)	11.269 (+)
		[<0.001]	[0.003]
REM	0.055 (–)	-----	1.488 (+)
	[0.972]		[0.475]
BSD	12.584 (+)	8550.73(+)	-----
	[0.002]	[<0.001]	
Panel B: Diagnostic Tests			
Dep. Var.	GDP	REM	BSD
AR (1)	–1.641	–1.363	–1.318
	[0.101]	[0.173]	[0.188]
AR(2)	0.698	–1.115	1.145
	[0.485]	[0.265]	[0.252]
Sargan Tests	104.647	97.350	102.112
	[0.408]	[0.611]	[0.478]

Notes: The Wald tests are based on equations (8) through (10). Test statistics are reported followed by their p–values within brackets. A +/– sign associated with a test statistic show sign of the cumulative effect of the relevant explanatory variable on the dependent variable. Panel B reports related diagnostic test results.

This result is in line with expectation under hypothesis one as well as what we found in the individual country analysis. On the other hand, neither domestic products nor advancement in banking sector have significant impact on the remittance flow. Remittance seems to flow independent of the macroeconomic aspect of the recipient nation. The negative sign on the cumulative effect of GDP growth on remittance is interesting to note. This means that, as an empirical support for the hypothesis two, an improvement of the national income of the recipient country would cause a slowdown in remittance inflow. This is not surprising as the aggregate need of the remittance recipients would fall as the overall economic development occurs.

Table 4 also shows that banking sector development, as measured by the private sector credit disbursement by the banking system, is significantly affected by both

remittance flow and GDP. It indicates to the fact that remittance flow makes additional funds available to banks for loan disbursement. Similarly, higher national income spurs enhanced economic activities resulting in increased credit flow to the private sector. The signs of the cumulative effects are also in line with the theoretical expectation.

The results obtained in the paper reinforce those found in many other studies that investigate the interplay between remittances, financial sector development and income growth. For example, Aggarwal et al. (2006) report findings that support the significant link between remittances and financial development in the developing countries. Similarly, Gupta et al. (2009) found that remittances have a direct poverty-mitigating effect and a positive impact on financial development. In the same line of inquiry, Giuliano and Ruiz-Arranz (2009) confirms that remittances tend to lower inequality in the developing nations. Yet in another paper, Mundaca (2009) found growth enhancing effects of remittances through increased availability of financial services aimed for appropriate utilizing remittances.

Panel B of Table 4 presents some relevant diagnostic test results. The null hypothesis of the absence of autocorrelation up to orders 1 and 2 cannot be rejected indicating that the error terms in each equation are free from serial correlation. In addition, we report results of the Sragan test of overidentifying restriction for each equation from (8) through (10). As can be seen, in all three cases one cannot reject the null that the instruments used (i.e. lagged values of the variables) are all valid. In other words, the instruments are not correlated with the error terms in the original model. These diagnostic test results lend support to the validity of our estimated models.

5. Concluding Remarks

The paper sought to explore the interrelationship among remittances inflow, banking sector development and national income in South Asian countries that are major labor exporters in a multivariate causality framework. Time series properties of the data dictated us to use error correction modeling in order to capture both short and long run causality running from one variable to the other. The overall results indicate that

remittances and banking sector development influence growth in per capita income in all four South Asian nations. However, the causal relationship between remittances inflow and banking sector is not the same for all countries meaning that country specific characteristics of banking sector and remittances inflow are at work within South Asian nations that share many economic realities among themselves. The results of the paper suggests that as smaller economies, Bangladesh, Pakistan and Sri Lanka stand to benefit to a large extent from banking sector expansion if restriction on remittances flows are eased.

The findings have important policy implications as well. Government in South Asian nations need to design appropriate incentive policies to ensure channeling of remittances through the banking system. Remittances, if channeled through commercial banks, can do two jobs at the same time. On the one hand, banks will be able to utilize these hard–earned foreign exchanges to their highest potential as capital goods rather than consumption goods, and thus enhancing the level of national income. On the other hand, commercial banks themselves would find additional resources beyond the national market which they could use to create additional assets for them. This would help the banks grow faster and smarter in the long run. In order to make sure that remittances do go through the banking system, it is imperative for transaction costs to be lower enough to attract wage earners' attention.

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Appendix: The Data Series Used in this Study (in log)

	Bangladesh			India			Pakistan			Sri Lanka		
Year	***GDP***	***REM***	***BSD***	***GDP***	***REM***	***BSD***	***GDP***	***REM***	***BSD***	***GDP***	***REM***	***BSD***
1976	5.460	0.188	2.965	5.362	0.642	20.259	5.662	3.089	21.932	5.940	0.362	12.975
1977	5.463	0.820	4.990	5.409	0.789	20.610	5.669	5.765	23.407	5.973	0.439	15.694
1978	5.509	0.865	4.534	5.442	0.870	22.635	5.716	7.346	22.260	6.011	1.427	20.311
1979	5.532	1.097	5.339	5.366	0.963	24.284	5.723	7.621	24.813	6.149	1.783	22.626
1980	5.517	1.871	5.771	5.408	1.517	23.993	5.791	8.645	23.407	6.091	3.778	17.165
1981	5.530	1.928	6.961	5.447	1.224	25.048	5.839	7.356	24.040	6.129	5.207	18.136
1982	5.529	2.908	7.344	5.461	1.344	26.920	5.875	8.423	24.703	6.157	6.061	19.624
1983	5.544	3.742	9.258	5.508	1.253	27.348	5.914	10.247	26.376	6.190	5.689	21.076
1984	5.570	2.547	12.125	5.528	1.111	29.125	5.937	8.285	24.218	6.227	4.980	19.303
1985	5.577	2.323	13.441	5.562	1.087	29.615	5.983	8.146	27.782	6.261	4.885	20.684
1986	5.596	2.722	13.157	5.588	0.920	31.261	6.010	7.668	29.786	6.286	5.089	20.356
1987	5.609	3.145	13.678	5.608	0.975	31.173	6.046	6.539	27.644	6.288	5.239	20.192
1988	5.608	2.980	14.944	5.681	0.795	31.174	6.093	4.866	26.369	6.298	5.130	21.800
1989	5.611	2.826	16.567	5.723	0.895	26.978	6.116	5.021	24.913	6.308	5.123	20.181
1990	5.646	2.586	16.656	5.759	0.752	25.242	6.134	5.014	24.157	6.358	4.993	19.616
1991	5.656	2.484	15.920	5.749	1.232	24.155	6.158	3.408	22.322	6.389	4.911	8.821
1992	5.683	2.876	14.546	5.781	1.186	25.122	6.207	3.236	23.617	6.423	5.648	9.056
1993	5.705	3.036	15.294	5.810	1.286	24.297	6.200	2.809	24.552	6.477	6.104	9.833
1994	5.722	3.408	16.271	5.864	1.816	23.993	6.211	3.370	24.006	6.517	6.101	10.957
1995	5.749	3.168	20.882	5.920	1.752	22.844	6.235	2.823	24.207	6.557	6.209	31.067
1996	5.773	3.307	21.597	5.974	2.274	23.858	6.258	2.028	24.694	6.584	6.131	29.896
1997	5.804	3.606	22.785	6.000	2.522	23.907	6.244	2.734	24.646	6.633	6.242	29.442
1998	5.835	3.642	23.236	6.041	2.291	24.104	6.245	1.884	25.114	6.668	6.477	28.722
1999	5.863	3.955	23.549	6.093	2.469	25.895	6.257	1.582	25.474	6.696	6.847	29.258
2000	5.901	4.179	24.666	6.116	2.801	28.845	6.275	1.466	22.528	6.738	7.139	28.835
2001	5.933	4.483	26.709	6.150	2.987	29.048	6.269	2.043	22.023	6.755	7.526	28.107
2002	5.957	6.015	28.930	6.172	3.102	32.760	6.277	4.972	21.925	6.779	7.916	28.580
2003	5.989	6.159	28.755	6.237	3.610	31.935	6.301	4.814	24.867	6.825	7.881	29.930
2004	6.031	6.323	30.141	6.303	3.072	36.883	6.339	4.104	29.297	6.866	7.926	31.547
2005	6.070	7.081	31.466	6.377	2.945	40.797	6.389	3.865	28.436	6.910	8.893	32.919

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